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ARM Facilities Newsletter

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ARM Assists Lilac Phenology Network

A Wisconsin scientist's interest in the seasonal changes of lilacs has resulted in plant monitoring at the ARM Program's SGP central facility that is contributing information about global climate change. The monitoring effort is the Lilac Phenology Network, overseen by Professor Mark D. Schwartz of the University of Wisconsin-Milwaukee. Schwartz is also president of the Wisconsin Phenological Society.

Phenology is the study of plant and animal responses to seasonal changes in their environment, especially weather and climate. Historically, farmers have used phenology to determine the best times for planting and harvesting crops. Schwartz is developing ways to use phenological observations as an indicator of global climate change.



Figure 1. Marilyn Dowell (left) and Mary Green, SGP Site Operations employees, monitor the lilacs at the central facility daily for phenological events (ARM photo).

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The most obvious phenology responses in plants are the first leafing and blooms associated with the onset of spring. Phenology studies are often conducted with either lilac or honeysuckle shrubs, which thrive in many climate regions and have phenological events that are easily observed.

Schwartz's effort to develop a more dense network of phenology study sites led, in part, to the lilac monitoring at the SGP central facility. The SGP is an excellent location for the Lilac Phenology Network because site personnel can monitor the plants, and vast amounts of meteorological data are available.

SGP Site Operations employees Mary Green and Marilyn Dowell monitor "Red Rothomagensis" lilacs (*Syringa chinensis*) planted at the central facility (Figure 1) and report their daily observations to Schwartz. The workers also water, fertilize, and weed the plants to keep them healthy.

Another source of information about phenology is satellite data on the color of Earth's surface, from which scientists can determine a vegetation index used to identify the onset of "greenness" in the spring. This index is helpful, but it is not always accurate. The satellite view is sometimes blocked by cloud cover, and the data do not distinguish the growing height of the vegetation detected.

Schwartz has developed a model based on phenology observations, plus surface temperature data, to predict the "green wave" of first leafing in spring. He uses this model to verify satellite-derived results and to fill gaps in the archive before satellite data became available. His results indicate a trend from 1959 to 1993 for earlier (by 5-6 days) springtime greenup in North America. Although this trend cannot be tied definitively to global warming, Schwartz has shown that we are experiencing warmer springtime temperatures.

Earlier spring onset affects the ecosystem. For example, earlier activity by insects (an important food source for birds) can affect the reproductive patterns of birds and the lives of their offspring.

On the Internet:

For more information on the Lilac Phenology Network visit this location:
<http://www.uwm.edu/~mds/enanet.html>

More information about Dr. Schwartz and phenology is at this location:
http://www.uwm.edu/Dept/Grad_Sch/Publications/ResearchProfile/Vol24No1/schwartz.html